



# Factors Related to Female Adolescent Parents' Acceptance of the Human Papillomavirus Vaccine

## Faktor-faktor yang Berhubungan dengan Penerimaan Orangtua Remaja Putri Terhadap Vaksin Human Papillomavirus

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### ABSTRACT

*The government of Indonesia instructs the Human Papillomavirus (HPV) vaccine to be a mandatory vaccine for young women in Indonesia. The HPV vaccine effectively protects against HPV infection by HPV types 16 and 18, which are responsible for more than 70% of cervical cancers. There are challenges in the implementation of HPV vaccination related to parental acceptance. This study aims to determine the factors that influence the acceptance of parents of young women to the HPV vaccine in the Pejuang Public Health Center area. This research performed a cross-sectional design with 197 parents or guardians of young women domiciled in the Pejuang Public Health Center area who were selected using consecutive sampling. Data analysis utilized the Chi-Square, Mann-Whitney, Independent T, and Multiple Logistic Regression with Backward Method tests. The results revealed that only three variables had a significant relationship with acceptance of the HPV vaccine with an odds ratio of knowledge (OR=3.01, p=0.000), attitude (OR=4.76, p=0.000), and health literacy (OR = 2.15, p=0.016). The results of multivariate analysis disclosed that the most influential factor in acceptance of the HPV vaccine was attitude (OR=4.41, p=0.00). This study concluded factors that influenced parents' acceptance of the HPV vaccine were knowledge, attitude, and health literacy, with the most influencing factor being attitude. Efforts to socialize the benefit of the HPV vaccine in the parental community are suggested to improve the attitudes of young women's parents to support their daughters in getting the HPV vaccine.*

### ABSTRAK

Pemerintah Indonesia menginstruksikan vaksin Human Papillomavirus (HPV) menjadi vaksin wajib bagi remaja putri di Indonesia. Vaksin HPV efektif melindungi terhadap infeksi HPV tipe 16 dan 18, yang memiliki peran terhadap lebih dari 70% kanker serviks. Terdapat tantangan dalam pelaksanaan vaksinasi HPV terkait penerimaan orang tua. Penelitian ini bertujuan untuk mengetahui faktor-faktor yang mempengaruhi penerimaan orang tua remaja putri terhadap vaksin HPV di wilayah Puskesmas Pejuang. Penelitian cross-sectional ini dilakukan terhadap 197 orang tua atau wali remaja putri yang berdomisili di wilayah Puskesmas Pejuang yang dipilih secara konsekutif sampling. Analisis data menggunakan uji Chi-Square, Mann-Whitney, Independent T, dan Regresi Logistik Berganda dengan Metode Backward. Hasil penelitian menunjukkan bahwa hanya tiga variabel yang memiliki hubungan signifikan terhadap penerimaan vaksin HPV dengan odds rasio pengetahuan (OR=3.01, p=0.000), sikap (OR=4.76, p=0.000), dan literasi kesehatan (OR = 2,15, p=0,016). Hasil analisis multivariat diketahui bahwa faktor yang paling berpengaruh terhadap penerimaan vaksin HPV adalah sikap (OR=4.41, p=0.00). Penelitian ini menyimpulkan bahwa faktor yang mempengaruhi penerimaan orang tua terhadap vaksin HPV adalah pengetahuan, sikap, dan literasi kesehatan, dengan faktor yang paling berpengaruh adalah sikap. Upaya sosialisasi manfaat vaksin HPV pada komunitas orang tua disarankan untuk meningkatkan sikap orang tua remaja putri dalam mendukung anak perempuannya mendapatkan vaksin HPV.

**Keywords:** Acceptance, Female Adolescent, Human Papillomavirus Vaccine, Parents.

**Kata Kunci :** Penerimaan, Remaja Putri, Vaksin Humanpapilloma virus, Orangtua

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## INTRODUCTION

The Global Burden of Cancer Study (Globocan) noted new cases of cervical cancer in Indonesia in 2021, reaching 36,633 cases and 21,003 deaths. This figure makes cervical cancer the most common cancer after breast cancer in women in Indonesia.<sup>1</sup> Prolonged infection by the *Human Papillomavirus* (HPV) is the leading cause of cervical cancer. HPV types 16 and 18 have a high risk of 70% causing cervical cancer and pre-cancer of the cervix.<sup>2</sup> HPV can be transmitted sexually, and many people are infected with HPV throughout their lives after they are sexually active. The World Health Organization (WHO) has established two strategies to prevent cervical cancer in women: vaccination of young women against the HPV, which is the causative agent of cervical cancer, and population-based screening and treatment of cervical cancer.<sup>3</sup> WHO stated that girls aged 9-13 should be given the vaccine with the need for two doses with an interval between doses of 6 months.<sup>3</sup> Vaccination with two doses of HPV vaccine can provide protection equivalent to administering three doses of HPV vaccine in children over the age of 13 years. Individuals who are not vaccinated before age 15 are advised to receive three doses of the HPV vaccine.<sup>4</sup> Therefore, older female adolescents may incur costs to complete the HPV vaccination.

HPV immunization is a mandatory immunization program that is free of charge by the government.<sup>5</sup> In 2021, the Government of Indonesia has determined that HPV immunization is compulsory in all regions of Indonesia. In the Decree of the Minister of Health concerning the 2022-2024 Human Papillomavirus Vaccine (HPV) Introduction Program, it was determined that the HPV immunization program would be carried out in all districts or cities in Indonesia by 2024.<sup>6</sup> WHO reports that the coverage of HPV vaccination in Indonesia for young women aged 15 years for the first dose in 2021 has only reached 5%. These results are still far from reaching the target set by WHO that 90% of girls are vaccinated with the HPV vaccine before the age of 15.<sup>7</sup> Vaccination

has been offered to young girls over nine years in Indonesia since 2017.

However, there are several problems in administering the HPV vaccine for young females, such as parental acceptance, availability of human resources, and budget.<sup>8</sup> Even though HPV immunization is free, acceptance of the vaccination program is not guaranteed because some parents still have reasons to oppose immunization.<sup>9</sup> Opposition from parents is among the most frequent reasons for not vaccinating female students.<sup>10</sup> Implementation of the HPV vaccination program must consider the willingness of parents to vaccinate their children.<sup>11</sup> A previous study reported that factors related to parental acceptance were gender, parental HPV vaccination status, parental age, parent's education level, having at least one daughter, number of daughters in the family, and having at least one daughter of vaccination age  $\geq$  nine years.<sup>12</sup> Another study stated that internet-based health literacy was essential to vaccination intentions.<sup>13</sup> Factors of the area of residence, education, employment, and income are also related to vaccination intentions.<sup>13</sup> Other research found that attitude was related to acceptance of the HPV vaccine.<sup>14</sup>

A preliminary study was conducted at the Pejuang Public Health Center, Bekasi City, by interviewing 11 parents who had adolescent daughters. The findings revealed that three parents had heard of cervical cancer but did not thoroughly understand it. Ten parents of young women said they had never heard of the HPV vaccine. In addition, 11 parents stated their daughters had not received the HPV vaccination. Based on the preliminary results, the researchers were eager to investigate the factors related to the acceptance of parents of young women of the HPV vaccine in the Pejuang Public Health Center, Bekasi City service area.

## METHODS

In this investigation, a cross-sectional study approach was used. The independent variables used in this study were the characteristics

of parents, including their ages, the ages of their teenage daughters, their marital status, gender, income, the number of their daughters, their most recent educational attainment, their employment status, the sources of HPV information, as well as their knowledge, attitudes, and HPV vaccination health literacy. The acceptance of the HPV vaccine by the parents of young women served as the dependent variable. The population in this study were all parents with adolescent daughters aged 10-14 years in the service area of Pejuang Public Health Center, Pejuang Village, Bekasi City. The sample size in this study was calculated using the Lemeshow sample size formula with the parameter proportion of one group. The researcher used the proportion of acceptance by parents of young women in Ethiopia of 84.9% as the value of proportion (P).<sup>15</sup> The sample calculation formula used the Lemeshow formula.

Based on a prior study, the researchers set a Z for 1.96, P for 0.849 (84.9%), and d for 0.05. Consequently, 197 parents made up the sample population for this study. The sampling technique utilized in this study was the consecutive sampling technique. The following were chosen as the inclusion criteria: (1) Parents or guardians of daughters aged 10-14 years and have not had an HPV vaccination; (2) Respondents who reside in the Pejuang Public Health Center's service area in Bekasi City; (3) Respondents who consent to participate in the study. Exclusion criteria were parents who did not stay in the study field during data collection.

This study employed questionnaires to gather data from interested participants, who were then given time to complete the questionnaires. The health community volunteers were made study enumerators through collaboration with the researchers in data collecting. The questionnaires that were utilized in this study were derived from earlier studies on Knowledge of HPV, Cervical Cancer, and Vaccine HPV and Attitude HPV, the Questionnaire Health Literacy regarding the HPV vaccine<sup>17</sup>, and the acceptance of the HPV vaccination questionnaire<sup>18</sup>.

Data analysis utilized was the Chi-square test, the Mann-Whitney test, and multiple logistic regression with backward method test. This research has received ethical approval from the educational institution of the health research ethics committee, Universitas Pembangunan Nasional "Veteran" Jakarta, with number 140/V/2023/KEPK.

## RESULTS

Based on Table 1, most respondents (186 participants, 94.4%) were female. There were 138 (70.1%) participants who got income less than the regional minimum wage of Bekasi City. A total of 182 participants (92.4%) were married. The study's results revealed that most participants (177 people, 89.8%) completed their primary and secondary education, and most (111 participants, 60.4%) received information from the media. Most participants had high knowledge (100 participants, 50.8%). Most of them had positive attitudes (111 participants, 56.3%), high health literacy (123 participants, 62.4%), and high acceptance of the HPV vaccine (116 participants, 58.9%).

**Table 1. Frequency Distribution of Independent and Dependent Variables on Respondents (n=197)**

Variable	Frequency (n)	Percentage (%)
<b>Gender</b>		
Female	186	94.4
Male	11	5.6
<b>Income</b>		
< Rp4.816.921	138	70.1
≥ Rp4.816.921	59	29.9
<b>Marital Status</b>		
Divorced	15	7.6
Married	182	92.4
<b>Last Education</b>		
Primary and secondary education	177	89.8
College	20	10.2
<b>Job Status</b>		
Unemployed	161	81.7
Work	36	18.3
<b>HPV Information Resource</b>		
Media	111	60.4
Nonmedia	86	43.7

<b>Knowledge</b>		
Low	97	49.2
High	100	50.8
<b>Attitude</b>		
Negative	86	43.7
Positive	111	56.3
<b>Health Literacy</b>		
Low	74	37.6
High	123	62.4
<b>Acceptance of the HPV Vaccine</b>		
Low	81	41.1
High	116	58.9

Table 2 depicts the result of the Mann-Whitney test. The result shows that the p-value is 0.83, indicating no significant relationship between the age of parents and the acceptance of the HPV vaccine. Table 2 also reveals a p-value of 0.86, meaning the p-value is more than 0.05. Therefore, no significant relationship exists between the number of girls and the acceptance of the HPV vaccine.

The results of Table 3 show that the parents of female adolescents have a high acceptance of the HPV vaccine by 107 parents (57.5%). Because there was an expected value of less than 5, the gender variable did not meet the requirements for the chi-square test. Therefore, an alternative test

was carried out with Fisher's exact test. The results of Fisher's test stated that the value of  $p = 0.129$ . This result indicates no significant relationship between gender and acceptance of the HPV vaccine. Table 3 also depicts the results of the relationship of income, marital status, education level, job status, HPV information resource, knowledge, attitude, and health literacy with acceptance of HPV vaccine using the Chi-Square test. Table 3 reveals only three variables got a p-value lower than 0.05. They are knowledge ( $p=0.000$ ), attitude ( $p=0.000$ ), and health literacy ( $p=0.016$ ), indicating significant relationships between them and acceptance of the HPV vaccine.

**Table 2. The relationship between the age of parents and the number of girls who received the HPV vaccine (n=197)**

Variable	Acceptance of the HPV Vaccine		P value
	Low	High	
Parents	81	116	0.83
Age	(41.11)	(58.89)	
Number of Girls	81	116	0.86
	(41.11)	(58.89)	

\*Mann-Whitney test

**Table 3. Bivariate Analysis Between Characteristic Factors, Knowledge, Attitudes, and Health Literacy with Acceptance of the HPV Vaccine**

Correlates with Acceptance of the HPV Vaccine									
Variable		Acceptance of the HPV Vaccine				Total		P value	OR (95%CI)
		Low		High					
		n	%	n	%	n	%		
<b>Gender</b>									
Female		79	42.5	107	57.5	186	100	0.129**	3.32 (0.70-15.8)
Male		2	18.2	9	81.8	11	100		
<b>Income</b>									
<Regional Minimum Wage		55	39.9	83	60.1	138	100	0.695*	0.84 (0.45-1.56)
≥Regional Minimum Wage		26	44.1	33	55.9	59	100		
<b>Marital Status</b>									
Divorced		7	46.7	8	53.3	15	100	0.856*	1.28 (0.44-3.67)
Married		74	40.7	108	59.3	182	100		
<b>Education</b>									
Primary	and	75	42.4	102	57.6	177	100	0.409*	1.72 (0.63-4.67)
Secondary									
College		6	30	14	70	20	100		
<b>Job Status</b>									
Unemployment		70	43.5	91	56.5	161	100	0.216*	1.75 (0.81-3.79)
Work		11	30.6	25	69.4	36	100		

**HPV Information Resource**

Media	47	42.3	64	57.7	111	100	0.802*	1.12
Non-Media	34	39.5	52	60.5	86	100		(0.63-1.99)

**Knowledge**

Low	53	54.6	44	45.4	97	100	0.000*	3.01
High	28	28	72	72	100	100		(1.71-5.6)

**Attitude**

Negative	53	61.6	33	38.4	86	100	0.000*	4.76
Positive	28	25.2	83	74.8	111	100		(2.58-8.76)

**Health Literacy**

Low	39	52.7	35	47.3	74	100	0.016*	2.15
High	42	34.1	81	65.9	123	100		(1.12-3.87)

\*Chi-square test

\*\*Fisher exact's test

All variables in this study will be selected for multivariate analysis. Only variables with a p-value of less than 0.25 would be included in multivariate analysis using the Logistic Regression Modeling Backward Method. They are gender, marital status, knowledge, attitudes, and health literacy, which are involved in multivariate analysis, as presented in Table 4.

**Table 4. Bivariate Variable Selection Results as Candidates for Logistic Regression Modeling**

Variable	P value	Decision
Parents Age	0.83	Not included in the candidate
Age of Young Women	0.83	Not included in the candidate
Number of Girls	0.86	Not included in the candidate
Gender	0.129*	Included for multivariate analysis
Income	0.695	Not included in the candidate
Education	0.856	Not included in the candidate
Job	0.409	Not included in the candidate
Marital Status	0.216*	Included for multivariate analysis
HPV Information Resource	0.802	Not included in the candidate
Knowledge	0.000*	Included for multivariate analysis
Attitude	0.000*	Included for multivariate analysis
Health Literacy	0.016*	Included for multivariate analysis

\*Included in multivariate analysis

The final model has been obtained through the 4-step backward method, as presented in Table 5. The results indicated that the attitude variable was the most influential factor that affected parental acceptance of the HPV vaccine in their daughters. The results unveil that a positive attitude contributes 4.4 times to having higher acceptance of the HPV vaccine compared to parents of young women who have a negative attitude.

**Table 5. Final Model Multivariate Analysis**

Variable	B value	SE	P value	OR	CI95%	
					Min	Max
Attitude	1.48	0.31	0.000	4.41	2.38	8.19
Health Literacy	0.56	0.32	0.080	1.76	0.93	3.30

## DISCUSSION

The results of this study stated that there was no significant relationship between the age of parents and receiving the HPV vaccine. The results of this study are not in line with prior research, which informed that older parents were 1.12 (OR = 1.125; 95% CI = 1.087, 1.164) more likely to vaccinate against HPV.<sup>19</sup> The results state that parents aged less than 35 to 45 years have a higher intention to vaccinate their youth with HPV compared to other age groups.<sup>20</sup> Research shows that the parent group aged  $\geq 50$  years has the lowest HPV vaccine behavioral intention than the group of parents aged 30-39 years and 40-49 years.<sup>21</sup>

The relationship between gender and acceptance of the HPV vaccine unveils that there is no significant relationship between gender and acceptance of the HPV vaccine. The findings of



this study differ from the results of a previous survey that mothers were 1.4 times more likely to contribute (OR = 1.4; 95% CI: 1.01–1.91) than fathers to provide permission to vaccinate their children with HPV.<sup>22</sup> Another study explained that the mother group had a higher knowledge score than the father group.<sup>21</sup> In society, mothers have a good parenting role and have a strong desire to protect their children from disease by vaccinating them.<sup>22</sup> In addition, as many as 70% of the respondents were women. This could be because the HPV virus can cause cervical cancer, and only women are affected by the disease.<sup>23</sup>

The relationship between income and acceptance of the HPV vaccine concludes that there is no significant relationship between income and parental acceptance of the HPV vaccine. The findings of this study are not in line with an earlier study, which reported that revenue had a substantial connection to acceptance of the HPV vaccine.<sup>24</sup> This issue is due to the lack of openness of parents with low incomes to information media and low levels of health literacy.<sup>24</sup>

The relationship between education and acceptance of the HPV vaccine declares that there is no significant relationship between education and the HPV vaccine. The results of this study are not in line with research conducted earlier that parents who have a high level of education are more likely (OR = 1.7; 95% CI: 1.11–2.47) to receive the HPV vaccine for young men compared to parents who have a lower level of education.<sup>22</sup> Students with parents who had less education showed much higher hesitancy about vaccines. Children and adolescents from households with highly educated caregivers highly intend to vaccinate.<sup>25</sup>

The relationship between marital status and acceptance of the HPV vaccine exhibits that there is no significant relationship between marital status and acceptance of the HPV vaccine. The findings of this study are not in line with previous research that married parents have a relationship with the willingness of parents to vaccinate their children with HPV with a p-value of 0.11.<sup>26</sup>

Another study's results stated that married caregivers were more open to vaccinating their children with HPV if recommended by a health professional.<sup>27</sup> Moreover, in prior research on ethnic groups, Malays tend to receive the COVID-19 vaccine more than Chinese and Indians.<sup>28</sup>

The relationship between work and acceptance of the HPV vaccine explains that there is no significant relationship between work and acceptance of the HPV vaccine. The results of this study were not in line with another study, which stated that parental work had a relationship with vaccine hesitancy.<sup>29</sup> Parents of young women who work as civil servants are likelier to know about vaccines than parents of young women who work as housewives. This issue is because educated parents have better access to information on HPV vaccination media.

The relationship between sources of information and acceptance of the HPV vaccine shows no significant relationship between sources of information and receipt of the HPV vaccine. A previous study showed that 78.38% of parents suggested ways to use social media, and 50.8% held educational seminars in schools by health workers to increase acceptance of HPV vaccination.<sup>30</sup> In that study, obtaining information from non-media or health workers was not the primary choice for parents. Communicating qualified health workers with patients can promote a trusting healing relationship.<sup>31</sup> Specific strategies must be implemented to build trust and rapport with the patient, ensure understanding, and demonstrate empathy and warmth.

The relationship between knowledge and acceptance of the HPV vaccine indicates a significant relationship between knowledge and acceptance of the HPV vaccine. This study's results align with another study that reported knowledge has a substantial connection with acceptance of the HPV vaccine.<sup>32</sup> Mothers who have good knowledge of the HPV vaccine contribute three times more to having a positive attitude compared to mothers of teenage girls who have poor knowledge.<sup>32</sup> Parents with good knowledge regarding the HPV vaccine can recognize the

benefits of the HPV vaccine and have the motivation to accept the HPV vaccine.<sup>33</sup> Knowledge indirectly increases the intention to vaccinate and will not perceive the vaccine as a threat, showing a greater desire to vaccinate.

The relationship between attitude and acceptance of the HPV vaccine states that there is a significant relationship between attitude and acceptance of the HPV vaccine. Parents of young women who have a negative attitude have an enormous contribution of 4.76 times at risk of having low acceptance of the HPV vaccine compared to parents of young women who have a high attitude score. The results of this study were in line with the study of Tuharea, it was found that there was a relationship between attitudes and community participation in the COVID-19 vaccine. The better the individual's attitude towards the COVID-19 vaccine, the more enthusiastic they are to participate in the COVID-19 vaccine program.<sup>42</sup>

In this recent study, attitude is the dominant factor that has a relationship with the acceptance of the HPV vaccine in the parents of young women. The results of this study are similar to a survey conducted earlier that mothers who have a positive attitude towards the HPV vaccine have a three times greater contribution (AOR=2.959; 95% CI=1.580–5.539; P=0.001) compared with mothers who have a negative attitude towards the HPV vaccine.<sup>32</sup>

The results of this study are like a survey of parents of adolescents in Nigeria who experience attitudes that have a strong correlation with intentions for adolescents to vaccinate against HPV.<sup>20</sup> A study conducted in Ethiopia showed that parents of young women who had a positive attitude towards HPV vaccination were 21.53 times more likely to receive HPV vaccination than parents who had a negative attitude.<sup>32</sup> Parents who want to protect their children from cervical cancer and HPV infection as the perceived benefits of HPV vaccination have a strong relationship with the intention to vaccinate HPV.<sup>34</sup> Parents' attitudes toward vaccines can be influenced by religious beliefs.<sup>35</sup> These findings were not described in this

study, so it is necessary to research to explore parents' religious beliefs regarding vaccine acceptance.

The relationship between health literacy and acceptance of the HPV vaccine reveals a significant relationship between health literacy and acceptance of the HPV vaccine. This study's results align with another research on health literacy that reported health literacy was related to acceptance of the HPV vaccine in students (OR = 1.26,  $p = 0.047$ ).<sup>36</sup> Research a significant relationship between health literacy and COVID-19 prevention behavior. This result means that the higher the level of health literacy, the higher the community's compliance with preventing COVID-19.<sup>37</sup>

Vaccine hesitancy must be fought by increasing health literacy.<sup>38</sup> Parents' low health literacy tends to have a negative impact on children's well-being and health.<sup>39</sup> Parents' lack of awareness or low health literacy significantly affects vaccines.<sup>40</sup> Therefore, it is suggested to promote the benefits of the HPV vaccine by utilizing health education in the community.<sup>41</sup> By doing that, young women's parents will support their daughters in getting the HPV vaccine optimally.

To increase HPV vaccine acceptance, the nurse-led program should prioritize enhancing health literacy through targeted, culturally sensitive education for both young women and their parents. Leveraging community engagement and technology can further amplify awareness, reduce vaccine hesitancy, and support informed decision-making.

As an observational study, causality between health literacy and vaccine acceptance in this study cannot be firmly established, and temporal changes in behavior or attitudes are not captured. To address the limitation of a cross-sectional design, it is suggested to consider employing a longitudinal study design in future research. Additionally, incorporating an intervention study (e.g., a quasi-experimental design) could help evaluate the direct impact of health literacy-focused educational programs on vaccine acceptance.

## CONCLUSION

Significant relationships existed between knowledge, attitudes, and health literacy with the acceptance of young women's parents for the HPV vaccine. There was no relationship between parents' age, age of young women, number of daughters, gender, income, marital status, education, job, and sources of information with the acceptance of parents of young women to the HPV vaccine. The attitude variable was the factor that most influence the acceptance of the HPV vaccine by parents of young women in the Pejuang Health Center area, with an OR value of 4.41 (2.38-8.19), which means that parents of young women who have a positive attitude contribute 4.4 times have higher acceptance of the HPV vaccine compared to the parents of young women who have a negative attitude.

Outreach programs can be held for parents of young women by providing cervical cancer health education and the HPV vaccine to increase parents' attitudes toward the HPV vaccine. Electronic and printed media can be considered a source of information because these media are the media that are the easiest to reach for parents of young women. Further research can be followed up by increasing the number of male parents as respondents. In addition, theoretically, there is a relationship between religious beliefs, communication between health workers and patients, and ethnicity, so it is necessary to expand the independent variables to improve further research.

## CONFLICT OF INTEREST

All authors have no conflict of interest in this article.

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